

11-3 Geometric Sequences

-sequence in which each term after the first is found by multiplying the previous term by a constant (common ratio)

ex:

3, 12, 48, ...

$$r = \underline{4}$$

$$\frac{12}{3} = 4 \quad \frac{48}{12} = 4$$

ex:

100, 20, 4, ...

$$r = \underline{\frac{1}{5}}$$

ex:

2, 6, 18, 54...

$$r = \underline{3}$$

Develop the formula.

$$a_2 = 2 \cdot 3 = 6$$

$$a_3 = 2 \cdot 3^2 = 18$$

$$a_4 = 2 \cdot 3^3 = 54$$

To find the nth term:

$$a_n = a_1 \cdot r^{n-1}$$

ex:

3, 9, 27, ...

Find a_7

$$a_7 = 3 \cdot 3^6 = 2,187$$

ex:

100, 25, 6.25, ...

$$r = \frac{1}{4}$$

Find a_5

$$a_5 = 100 \left(\frac{1}{4} \right)^4$$

$$a_5 = \frac{25}{64}$$

ex:

Write an equation for a_n

5, 10, 20, 40, ...

$$r = 2$$

$$a_n = 5(2)^{n-1}$$

ex:

$$a_7 = 1536$$

$$a_3 = 96$$

$$r = 2$$

$$a_7 = 96(2)^{7-3}$$

Geometric Means--terms between two given terms

ex:

Find three geometric means between 300 and $\frac{6075}{64}$

$$300, _, _, _, \frac{6075}{64}$$

$$\frac{6075}{64} = 300r^4$$

$$\left(\frac{81}{256}\right)^{\frac{1}{4}} = (r^4)^{\frac{1}{4}}$$

$$\pm \frac{3}{4} = r$$

$$225, 56\frac{25}{4}, \frac{2025}{16}$$

$$-225, 56\frac{1}{4}, -\frac{2025}{4}$$

DO:

Find three geometric means between -3 and -12,288

$$-12,288 = -3r^4$$

$$4096 = r^4$$

$$\pm 8 = r$$

$$r=+8 \quad -24, -192, -1536$$

$$r=-8 \quad 24, -192, 1536$$

HW

p591

15, 17, 21, 23, 31- 39odd, 38, 43, 45